RL/REG-99-02

REGULATORY UNIT (RU) EVALUATION

OF THE BNFL INC.

RADIATION PROTECTION PROGRAM FOR DESIGN

December 1, 1998

Office of Radiological, Nuclear, and Process Safety
of TWRS-P
Richland, Washington

Approve by: _____

Date: _____

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PREFACE

The Department of Energy's (DOE) Richland Operations Office (RL) issued a request for proposal in February 1996 for privatized processing of waste as part of the Hanford Tank Waste Remediation System (TWRS). Offerors were requested to submit proposals for the initial processing of the tank waste at the Hanford Site. Some of this radioactive waste has been stored in large underground storage tanks at the Site since 1944. Currently, approximately 54 million gallons of waste containing approximately 250,000 metric tons of processed chemicals and 215 million curies of radionuclides are being stored in 177 tanks. These caustic wastes are in the form of liquids, slurries, saltcakes, and sludges. The wastes stored in the tanks are defined as high-level radioactive waste (10 CFR Part 50, Appendix F) and hazardous waste (Resource Conservation and Recovery Act).

Under the privatization concept, DOE intends to purchase waste processing services from a contractor-owned, contractor-operated facility through a fixed-price contract. DOE will provide the waste feedstock to be processed but maintain ownership of the waste. The contractor must: a) provide private financing; b) design the equipment and facility; c) apply for and receive required permits and licenses; d) construct the facility and commission its operation; e) operate the facility to process tank waste according to DOE specifications; and f) deactivate the facility.

The TWRS Privatization Program is divided into two phases, Phase I and Phase II. Phase I is a proof-of-concept/commercial demonstration-scale effort the objectives of which are to a) demonstrate the technical and business viability of using privatized contractors to process Hanford tank waste; b) define and maintain adequate levels of radiological, nuclear, process, and occupational safety; c) maintain environmental protection and compliance; and d) substantially reduce life-cycle costs and time required to process the tank waste. The Phase I effort consists of three parts: Part A, Part B-1, and Part B-2.

Part A is a twenty-month period to establish technical, operational, regulatory, and financial elements necessary for privatized waste processing services at fixed-unit prices. This includes identification by the TWRS Privatization Contractors and approval by DOE of appropriate safety standards, formulation by the Contractors and approval by DOE of integrated safety management plans, and preparation by the Contractors and evaluation by DOE of initial safety assessments. Of the twenty-month period, sixteen months is for the Contractors to develop the Part-A deliverables and four months is for DOE to evaluate the deliverables and determine whether to authorize Contractors to perform Part B. Part A culminated in DOE's authorization on August 24, 1998, of BNFL Inc. to perform Part B.

Part B-1 is a twenty-four month period to a) further the waste processing system design introduced in Part A, b) revise the technical, operational, regulatory, and financial elements established in Part A, c) provide firm fixed-unit prices for the waste processing services, and d) achieve financial closure.

Part B-2 is a sixteen year period to complete design, construction, and permitting of the privatized facilities; provide waste processing services for representative tank wastes at firm fixed-unit prices; and deactivate the facilities. During Part B-2, approximately 10% of the total Hanford tank wastes will be processed.

Phase II will be a full-scale production effort. The objectives of Phase II are to implement the lessons learned from Phase I and to process all remaining tank waste into forms suitable for final disposal.

A key element of the TWRS Privatization Program is DOE's regulation of radiological, nuclear, and process safety through the establishment of a specifically defined regulatory approach and a specifically chartered, dedicated Regulatory Unit (RU) at RL. This regulation is authorized by DOE through the document entitled *Policy for Radiological, Nuclear, and Process Safety Regulation of TWRS Privatization Contractors* (referred to as the Policy) and is implemented through the document entitled *Memorandum of Agreement for the Execution of Radiological, Nuclear, and Process Safety Regulation of the TWRS Privatization Contractors* (referred to as the MOA). The Policy is signed by the Under Secretary of Energy; the Manager, RL; the Assistant Secretary for Environment, Safety and Health (ASEH); and the Assistant Secretary for Environmental Management (ASEM). The MOA is signed by the Manager, RL; the ASEH; and the ASEM. The MOA details certain interactions among RL, the ASEH, and the ASEM as well as their respective roles and responsibilities for implementation of the regulatory approach.

The authority of the RU to regulate the TWRS Privatization Contractor is derived solely from the terms of the TWRS Privatization Contract. Its authority to regulate the Contractor on behalf of DOE is derived from the Policy. The characteristics and scope of this special regulatory approach (special in the sense that it is based on terms of a contract rather than formally promulgated regulations) are delineated in the MOA, the TWRS Privatization Contract, and the following four documents, which are incorporated into the Contract and are part of the MOA.

> *Concept of the DOE Regulatory Process for Radiological, Nuclear, and Process Safety for TWRS Privatization Contractors*, DOE/RL-96-0005
>
> *DOE Regulatory Process for Radiological, Nuclear, and Process Safety for TWRS Privatization Contractors*, DOE/RL-96-0003
>
> *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for TWRS Privatization Contractors*, DOE/RL-96-0006
>
> *Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for TWRS Privatization*, DOE/RL-96-0004

Regulation by the RU in no way replaces any legally established external regulatory authority to regulate in accordance with their duly promulgated regulations nor relieves the Contractor from any obligations to comply with such regulations or to be subject to the enforcement practices contained therein.

In the execution of the regulatory approach through its regulatory program, DOE expects the RU to consider not only the relevant approaches and practices of DOE but also those of the Nuclear Regulatory Commission (NRC). The Policy states that

"It is DOE's policy that TWRS privatized contractor activities be regulated in a manner that assures adequate radiological, nuclear, and process safety by application of regulatory concepts and principles consistent with those of the Nuclear Regulatory Commission."

To this end, the RU interacts with the NRC (under the provisions of a memorandum of understanding with the NRC) during development of regulatory guidance and during execution of the regulatory program to ensure implementation of this policy.

All documents issued by the Office of Radiological, Nuclear, and Process Safety Regulation of TWRS-P Contractors are available to the public for review at DOE/RL Public Reading Room at the Washington State University, Tri-Cities Campus, 2770 University Dr., Richland, Washington. Copies may be purchased for a duplication fee.

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Executive Summary

This report documents the Office of Radiological, Nuclear, and Process Safety Regulation of TWRS Privatization Contractors (Regulatory Unit) evaluation of the BNFL Inc., “Radiation Protection Program for Design” (RPP), which was submitted for approval on October 2, 1998. 10 CFR 835, “Occupational Radiation Protection,” requires that work activity, including design work involving potential occupational radiation exposure, be conducted in compliance with a documented radiation protection program approved by DOE.

BNFL submitted the initial RPP to the Regulatory Unit (RU) on August 31, 1998. The RU performed an acceptability review to verify that that the basic program elements required by 10 CFR 835 were included in the submittal. The purpose of the acceptability review was to determine if the RU should proceed with the detailed review and to provide BNFL early feedback regarding the acceptability of the RPP. The RU found that the RPP did not contain sufficient information to start a detailed review.

BNFL subsequently retracted the submittal, and on October 2, 1998, BNFL submitted a revised RPP for review by the RU. The RU performed an acceptability review of the document and notified BNFL on October 9, 1998, that the revised submittal contained sufficient information to start a detailed review.

For 10 CFR 835, the documented RPP also fulfills the role of the document commonly referred to as an "Implementation Plan" in other DOE rules such as 10 CFR 830.120, “Quality Assurance Requirements.” The guidance provided to DOE contractors regarding compliance with 10 CFR 835 is contained in a series of Implementation Guides (IGs) that provide acceptable methodologies for developing and documenting the radiation protection program. The information contained in the IGs represents an acceptable method of program implementation and is not mandatory.

During the review, the reviewers developed two sets of questions for BNFL regarding the RPP submittal. The first question set related to RPP format and content. It was not clear to the reviewers whether a cross-reference table (Appendix A to the RPP) contained commitments to comply with 10 CFR 835 requirements. BNFL’s response to Question Set No. 1 included a commitment to clearly state the 10 CFR 835 compliance commitments in the RPP, and a commitment to issue a revision to the RPP reflecting these changes.

The second question set asked for clarification of roles and responsibilities and the hierarchy of the BNFL procedures system. The RU was concerned that BNFL had committed to start preliminary design by November 25, 1998, but many of the procedures to implement RPP commitments had not been developed. Late in the review period, BNFL was requested to confirm that all the procedures to implement the RPP were approved and issued. BNFL provided confirmation in a letter on November 24, 1998.

The reviewers assessed the RPP submittal using the approved review guidance issued by the RU. The measures identified in the RPP for achieving compliance with 10 CFR 835 were reviewed using the applicable criteria provided in the review guidance document. The review criteria, based on 10 CFR 835 and contract requirements were:

- Criterion (a): The content of each RPP shall be commensurate with the nature of the activities performed.

- Criterion (b): The content of the RPP shall include measures, such as Contractor policies, programs, procedures and/or work instructions, for achieving compliance with each requirement of 10 CFR 835.

- Criterion (c): The content of the RPP conforms to the requirements of other approved contract deliverables such as the Safety Requirements Document.

The reviewers found that all the RPP measures for achieving compliance with 10 CFR 835 met the review criteria established in the RU review guidance documents. As such, the reviewers concluded that the RPP, when properly implemented, can achieve compliance with the regulations.

Based on the results of the review and BNFL's letter confirming that all procedures to implement the RPP are approved and issued, the reviewers recommended that the Regulatory Official approve the BNFL RPP for design.

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EVALUATION OF THE BNFL RADIATION PROTECTION PROGRAM FOR DESIGN

1.0 INTRODUCTION

1.1 REQUIREMENTS

This report documents the Office of Radiological, Nuclear, and Process Safety Regulation of TWRS Privatization Contractors (Regulatory Unit) evaluation of the BNFL Inc. "Radiation Protection Program for Design" (RPP)[1], which was submitted for approval on October 2, 1998. 10 CFR 835, "Occupational Radiation Protection," requires that work activity, including design work involving potential occupational radiation exposure, be conducted in compliance with a documented radiation protection program approved by DOE[2].

Not all requirements in 10 CFR 835 are required to be addressed in an RPP limited in scope to the design phase of the project. However, the RPP shall specify the tasks intended to be within the scope of the program, and the content of the RPP shall be commensurate with the nature of the activities to be performed[3]. 10 CFR 835.101(e) states that the content of the RPP shall address, but shall not necessarily be limited to the requirements in Part 835. However, the DOE implementation guide for radiation protection programs cautions that any activity identified by the contractor as being within the scope of the RPP will also be subject to enforcement as any other 10 CFR 835 requirement. Although not specifically required to be part of the RPP ALARA[a] program, BNFL's ALARA design process described in the RPP will also be applied to systems and components designed to protect the public and the environment[4].

Effective occupational radiation protection programs ensure that the health and safety of the work force is adequately protected by maintaining individual and collective radiation doses below regulatory limits and by implementing a process that seeks to attain doses that are as low as is reasonably achievable (ALARA). The documented RPP includes the programs, plans, procedures, schedules, and other measures undertaken to ensure worker health and safety through compliance with 10 CFR 835.

[a] ALARA means "as Low As is Reasonably Achievable," which is the approach to radiation protection to manage and control exposures (both individual and collective) to the workforce and to the general public to as low as is reasonable, taking into account social, technical, economic, practical and public policy considerations. ALARA is not a dose limit but a process which has the objective of attaining doses as far below the applicable limits of this part as is reasonably achievable. (Federal Register/Vol. 58, No. 238 - 12/14/93/Rules and Regulations, 835.2 Definitions)

1.2 REVIEW GUIDANCE

The reviewers assessed the RPP submittal using the approved review guidance issued by the RU[5]. The measures identified in the RPP for achieving compliance with 10 CFR 835 were reviewed using the applicable criteria provided in the review guidance document. The review criteria, based on 10 CFR 835 and contract requirements were:

- Criterion (a): The content of each RPP shall be commensurate with the nature of the activities performed.

- Criterion (b): The content of the RPP shall include measures, such as Contractor policies, programs, procedures and/or work instructions, for achieving compliance with each requirement of 10 CFR 835.

- Criterion (c): The content of the RPP conforms to the requirements of other approved contract deliverables such as the Safety Requirements Document.

Attributes were included in the review guidance to assist the reviewers in determining the acceptability of the measures to achieve compliance with the requirements. In general, the attributes expressed the expectation that the measures for achieving compliance be complete, implementable, and based on proven consensus standards; for example, industry codes and standards, DOE Implementation Guides, NRC Regulatory Guides, or international standards.

Meeting the applicable review criteria ensures that the measure being evaluated, when properly implemented, will achieve compliance with 10 CFR 835. For some 10 CFR 835 requirements, the language in the regulation is sufficiently specific that a policy statement or commitment in the RPP to comply with the requirement is an acceptable measure for achieving compliance with that requirement, without further measures needed in the RPP.

1.3 DOE IMPLEMENTATION GUIDES

For 10 CFR 835, the documented RPP also fulfills the role of the document commonly referred to as an "Implementation Plan" in other DOE rules such as 10 CFR 830.120, “Quality Assurance Requirements.” The guidance provided to DOE contractors regarding compliance with 10 CFR 835 is contained in a series of Implementation Guides (IGs) that provide acceptable methodologies for developing and documenting the radiation protection program[6]. The information contained in the IGs represents an acceptable method of program implementation and is not mandatory.

In some cases, BNFL’s measures for achieving compliance with 10 CFR 835 rely on elements documented in the BNFL Quality Assurance Program (QAP)[7]. This approach is acceptable to the Regulatory Unit (RU) because the BNFL QAP commits to develop procedures to implement the elements of the QAP. The QAP further states that these procedures shall be developed, approved, and controlled to define performance of work

and the acceptance criteria necessary to verify work quality in accordance with the approved QAP.

The RU did not review and approve all the documents that implement BNFL's documented RPP. Rather, the RU reviewed the measures identified by BNFL in the RPP to determine that BNFL had adequately addressed each requirement of 10 CFR 835. Based upon review of implementing procedures, and knowledge of other BNFL policies and procedures, the RU determined whether implementation of the RPP would ensure that all 10 CFR 835 requirements will be met. This approach is consistent with the guidance provided in the DOE implementation guide for radiation protection programs[8]. Future regulatory compliance inspections will verify the adequacy of BNFL's RPP implementation.

Although the RU did not approve BNFL's implementing procedures that support the RPP, the reviewers examined the procedures available to verify that their scope and content were sufficient to assure that the RPP could be implemented. Evaluation of implementability of the measures for achieving compliance with 10 CFR 835 is documented in a separate section in this report (Section 6.0).

1.4 RPP REVIEW AND EVALUATION PROCESS

BNFL submitted the initial RPP[9] to the RU on August 31, 1998. The RU performed an acceptability review to verify that that the basic program elements required by 10 CFR 835 were included in the submittal. The purpose of the acceptability review was to determine if the RU should proceed with the detailed review and to provide BNFL early feedback regarding the acceptability of the RPP. The RU found that the RPP did not contain sufficient information to start a detailed review.

BNFL subsequently retracted the submittal, and on October 2, 1998, BNFL submitted a revised RPP[10] for review by the RU. The RU performed an acceptability review of the document and notified BNFL[11] on October 9, 1998, that the revised submittal contained sufficient information to start a detailed review.

During the review, the reviewers developed two sets of questions for BNFL regarding the RPP submittal[12,13]. The first question set was related to the RPP format and content. It was not clear to the reviewers whether the contents in a cross-reference table (Appendix A to the RPP) were commitments to comply with 10 CFR 835 requirements. BNFL's response to Question Set No. 1 included a commitment to clearly state the 10 CFR 835 compliance measures in the RPP, and a commitment to issue a revision to the RPP reflecting these changes[14].

The second question set asked for clarification of roles and responsibilities and the hierarchy of the BNFL procedures system. The RU was concerned that BNFL had committed to start preliminary design by November 25, 1998, but many of the procedures to implement RPP commitments had not been developed. Late in the review period,

BNFL was requested to confirm that all the procedures to implement the RPP were approved and issued. BNFL provided confirmation in a letter on November 24, 1998[15].

2.0 GENERAL PROGRAM PROVISIONS

2.1 EVALUATION

2.1.1 § 835.2 Definitions and § 835.4 Radiological Units

The contractor is required to use the definitions and radiological units contained in § 835.2 "Definitions," and § 835.4 "Radiological Units" respectively. In Section 5.0 and 5.3 of the RPP, BNFL committed to use the definitions and units required in the regulation. The reviewers found these commitments to be acceptable measures for achieving compliance with the definitions requirement in § 835.2 and the radiological units requirement in § 835.4. The reviewers concluded that the RPP review criteria discussed in Section 1.2 of this report had been met.

2.1.2 § 835.3 General Rule

The General Rule provisions of 10 CFR 835.3 specify the management policy requirements for implementing the RPP. Sections 3.0 and 5.0 of the RPP contain BNFL's policy statements committing to the implementation requirements of § 835.3. The BNFL policy statements essentially repeated the text of the regulation. The reviewers found these commitments to be acceptable measures for achieving compliance with the General Rule provisions, and concluded that the review criteria identified in Section 1.2 had been met.

3.0 RADIATION PROTECTION PROGRAM REQUIREMENTS

3.1 EVALUATION

3.1.1 § 835.101 RPP - General Requirements

The radiation protection program general requirements are contained in § 835.101(a) through (g). These requirements specify that a DOE activity shall be conducted in compliance with a DOE-approved RPP that addresses each 10 CFR 835 requirement, and also specifies that the scope and content of the RPP be commensurate with the proposed activities specified. (Compliance with the § 835.101(c) requirement to apply the ALARA process to occupational exposure is evaluated in Section 5.2 of this report.)

BNFL addressed the applicable general program requirements (for the design phase) in Sections 4 and 5 of the RPP by including policy statements of intent to comply with each of the requirements. The RPP identified the tasks that were intended to be within the scope of the RPP and measures were identified through Appendix A of the RPP for

achieving compliance with all applicable requirements. The reviewers found that these policy statements and commitments were acceptable measures for achieving compliance with the general program requirements in § 835.101 "Radiation Protection Programs," and consistent with the review criteria identified in Section 1.2.

3.1.2 § 835.101 RPP - Managing Changes and Updates

Revisions and changes to the RPP are required to be managed in accordance with § 835.101(h) through (j). BNFL's approach to maintaining the RPP is found in Section 5.1 of the RPP, where BNFL committed to the requirements in § 835.101(h) through (j). The process for evaluating changes to the radiation protection program that could reduce the effectiveness of the program conformed with the guidelines provided in the DOE implementation guide[16]. Changes made to the RPP will be in compliance with BNFL procedures for managing changes to the authorization basis.

The reviewers found the process for managing changes and updates to the RPP acceptable when evaluated against the criteria identified in Section 1.2. Specifically, the reviewers found these measures adequate to achieve compliance with § 835.101 "Radiation Protection Programs," paragraphs (h) through (j). The reviewers concluded that review criteria identified in Section 1.2 had been met.

3.1.3 § 835.102 Internal Audits

BNFL is required to conduct internal audits of program elements no less frequently than every three years. A question arose regarding the intent of this requirement because the BNFL design phase is scheduled to last less than three years. The RU position is that § 835.102 specifies: 1) that audits be conducted, and 2) that the interval between the audits be less than three years. In Section 5.2 of the RPP, BNFL committed to audit the radiation protection program in accordance with the BNFL QAP on a frequency not less than every three years. BNFL also committed to use qualified and knowledgeable auditors who are independent of the radiation protection organization.

In general, the reviewers found the QAP measures to achieve compliance with program audit provisions to be acceptable and met the review criteria identified in Section 1.2. Specifically, the reviewers found the QAP measures adequate to achieve compliance with program audit provisions of § 835.102. This finding was based in part on BNFL's QAP commitment that procedures to implement the QAP shall be developed, approved, and controlled to define performance of work and the acceptance criteria necessary to verify work quality in accordance with the approved QAP.

4.0 RECORDS

4.1 EVALUATION

4.1.1 § 835.701 General Provisions and § 835.704 Administrative Records

The general provisions for recordkeeping require records be maintained to document compliance with the radiation protection program and also require that records be maintained until DOE authorizes disposition. The administrative records management requirements for the design phase include records pertaining to training, ALARA design, and reviews of the radiation protection program content and implementation.

BNFL's measures for compliance with § 835.701 and § 835.704 are found in Section 5.3 of the RPP. In the RPP, BNFL committed to follow the process presented in the DOE approved QAP[17] (QAP), Chapter 4.0, "Documents and Records." The QAP addresses preparation, validation, identification, collection, retention, changes, maintenance, and storage. The RPP also stated in Section 5.3 that unless otherwise specified by 10 CFR 835, records shall be retained until final disposition is authorized by DOE.

The measures contained in Section 5.3 of the RPP, when supplemented by commitments in Chapter 4.0 of the QAP, were adequate to achieve compliance with § 835.701 and §835.704 regarding provisions for records management. This finding was based in part on BNFL's QAP commitment that procedures to implement the QAP shall be developed, approved, and controlled to define performance of work and the acceptance criteria necessary to verify work quality in accordance with the approved QAP. The reviewers concluded that the review criteria discussed in Section 1.2 had been met.

4.1.2 § 835.702 Individual Monitoring Records

Individual monitoring records are not required to be maintained unless there is a potential for exposure to ionizing radiation. During design, personnel exposure is not expected to occur, however, BNFL chose to address this requirement. The RU did not evaluate the measures identified by BNFL to achieve compliance with § 835.702, except to determine that they did not conflict with other 10 CFR 835 requirements. Conflicts with the other 10 CFR 835 requirements were not identified by the reviewers.

5.0 ALARA DESIGN PROGRAM

5.1 EVALUATION

5.1.1 § 835.101(c) ALARA Program, § 835.1001 Design and Control

BNFL's formal plans and measures for applying the ALARA process to occupational exposure are found in Section 5.5 of the RPP. Sections 5.5.9 and 5.5.10 discuss ALARA design processes and criteria including the use of physical design and administrative controls. These two sections contain information that is consistent with the 10 CFR 835 requirements and state that physical design features, rather than administrative controls, will be used to maintain radiation doses ALARA. Each element of the ALARA program

was discussed in detail and followed the guidelines in the DOE Implementation Guide for occupational ALARA programs[18].

The topics addressed in Section 5.5 of the RPP included: 1) ALARA policy and management commitment, 2) organization and responsibilities, 3) administrative control levels, 4) radiological performance goals and indicators, 5) ALARA training, 6) plans and procedures, 7) internal audits and assessments, 8) optimization methodology, 9) ALARA design process, 10) ALARA design criteria, 11) ALARA design process components, 12) ALARA documentation, 13) radiological work planning, and 14) records.

The reviewers verified that the scope and content of the fourteen components presented in Section 5.5 of the RPP were consistent with the guidelines found in NRC Regulatory Guide 8.8[19] and ICRP 55[20]. The reviewers found the content of the ALARA Program for design to be acceptable using the review criteria identified in Section 1.2. Based on a finding that the measures complied with 10 CFR 835 requirements and were consistent with consensus standards, the reviewers determined the measures were acceptable.

5.1.2 § 835.1002 Facility Design and § 835.1003 Control Procedures

Section 5.5.8 provided information on how the Contractor will apply cost-benefit analysis, which is one of many optimization methods. Section 5.5.10.5 repeats the 10 CFR 835 requirements, and additionally states that formal cost-benefit analysis will be used in all ALARA decisions.

The BNFL optimization method considers all doses and total life-cycle financial costs. The dollar value of the person-rem used in the optimization procedure ranges from $2,000 to $10,000 depending on the potential dose savings in question. The $2,000 per person-rem applies to exposures of less than about 500 mrem per year, while the $10,000 per person-rem value is used for higher doses, typically greater than 1 rem per year. BNFL's optimization methodology is consistent with the guidance and descriptions found in NRC Regulatory Guide 8.8 and ICRP 55.

Section 5.4.10 of the RPP describes the ALARA design criteria. The criteria properly incorporate all the design criteria specified as requirements in § 835.1002 and § 835.1003 by essentially adopting the requirements verbatim from the rule.

Based on the finding that the optimization method is consistent with widely accepted nuclear industry standards and that the design criteria in § 835.1002 were adequately addressed, the reviewers determined that the measures for achieving compliance with § 835.1002 "Facility Design and Modifications" were acceptable. The reviewers concluded that the review criteria identified in Section 1.2 had been met.

6.0 IMPLEMENTABILITY OF THE RPP

6.1 EVALUATION

6.1.1 § 835.101 Radiation Protection Programs

The § 835.101 requirement to conduct a DOE activity in compliance with a documented RPP implies the ability to implement the measures committed to in the RPP. Part 835 does not require the contractor to formally declare readiness to conduct a DOE activity covered by an approved RPP. The RU evaluated the implementability of the RPP based on the review of a sample of implementing procedures with sufficient content to provide assurance that the measures identified in the RPP can be implemented, and BNFL formal certification that such measures existed.

In general, the RPP contained adequate information to demonstrate that BNFL's design activities will comply with the appropriate 10 CFR 835 requirements pertaining to design and control. In evaluating the implementability of the RPP, the reviewers considered questions such as whether designers of the facility would have the necessary tools to successfully implement the measures identified in the RPP. In some cases, the RPP or the procedures and supporting documents simply restated the requirements without providing significant information pertaining to implementation. BNFL appeared to rely on the qualifications and experience of the designers, together with an extensive design review process, to ensure that the requirements are met.

Based on the results of the implementability review the reviewers recommended that BNFL provide a letter to the RU confirming that all the procedures to implement the RPP are approved and issued. BNFL provided confirmation in a letter on November 24, 1998. Based on the implementability review and BNFL's letter confirming the implementability of the RPP, the RU determined that the RPP for design is adequate to achieve compliance with 10 CFR 835.

7.0 CONCLUSIONS AND RECOMMENDATION

The reviewers found that all the RPP measures for achieving compliance with 10 CFR 835 met the review criteria established in the RU review guidance documents. As such, the reviewers concluded that the RPP, when properly implemented, can achieve compliance with the regulations.

Based on the results of the review and BNFL's letter confirming that all procedures to implement the RPP are approved and issued, the reviewers recommended that the Regulatory Official approve the BNFL RPP for design.

8.0 ACRONYMS

ALARA	As Low as is Reasonably Achievable
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
ICRP	International Commission on Radiological Protection
NRC	Unites States Nuclear Regulatory Commission
QAP	Quality Assurance Program
RPP	Radiation Protection Program
RU	Regulatory Unit
TWRS-P	Tank Waste Remediation System Privatization

9.0 ENDNOTES

[1] BNFL-TWP-SER-003, Revision 0, Radiation Protection Program for Design, October 2, 1998.
[2] U.S. Department of Energy, *Code of Federal Regulations*, 10 CFR Part 835, Occupational Radiation Protection, § 835.101(a).
[3] U.S. Department of Energy, *Code of Federal Regulations*, 10 CFR Part 835, Occupational Radiation Protection, § 835.101(c).
[4] BNFL Letter No. 000780, D.W. Edwards to D.C. Clark, TWRS-P Contract No. DE-AC06-96RL13308-W375-Safety Criteria 5.3-1, Attachment: Safety Criterion 5.3-1: Re-Evaluation of Applicable Codes and Standards, November 25, 1998.
[5] RL/REG-97-11, Revision 0, Guidance for Review of the TRWS Privatization Contractor Radiation Protection Program Document Required By 10 CFR 835, Occupational Radiation Protection, August 3, 1998.
[6] U.S. Department of Energy Implementation Guide G-10 CFR/B1, Radiation Protection Program, Revision 1, November 1994, Section 1, page 1.
[7] BNFL-5193-QAP-01, Rev. 4, BNFL Quality Assurance Program and Implementation Plan, May 1998.
[8] U.S. Department of Energy Implementation Guide G-10 CFR/B1, Radiation Protection Program, Revision 1, November 1994.
[9] BNFL-TWP-SER-003, Revision A, Radiation Protection Program for Design, August 28, 1998.
[10] BNFL-TWP-SER-003, Revision 0, Radiation Protection Program for Design, October 2, 1998.
[11] RU Letter 98-RU-0316, D.C. Gibbs to M.J. Bullock, Acceptability Review of the BNFL Radiation Protection Program (RPP) for Design, BNFL-TWP-SER-003, Rev. 0, October 9, 1998.
[12] RU Letter 98-RU-0327, D.C. Gibbs to M.J. Bullock, First Set of Questions to the BNFL Radiation Protection Program (RPP) for Design, October 22, 1998.
[13] RU Letter 99-RU-0022, D.C. Gibbs to M.J. Bullock, Second Set of Questions on the BNFL Radiation Protection Program (RPP) for Design, November 6, 1998.
[14] BNFL Letter No. 000447, D.W. Edwards to D.C. Gibbs, TWRS-P Contract No. DE-AC06-96RL13308-W375-BNFL Inc. Response to First Set of RU Questions on BNFL-TWP-SER-003, Rev. 0, October 30, 1998.
[15] BNFL Letter No. 000727, D.W. Edwards to D.C. Clark, TWRS-P Contract No. DE-AC06-96RL13308-W375-Radiation Protection Implementing Procedures, November 24, 1998.
[16] U.S. Department of Energy Implementation Guide G-10 CFR/B1, Radiation Protection Program, Revision 1, November 1994.
[17] BNFL-5193-QAP-01, Rev. 4, BNFL Quality Assurance Program and Implementation Plan, May 1998.
[18] U.S. Department of Energy Implementation Guide G-10 CFR/B2, Occupational ALARA Program, Revision 1, November 1994.

[19] U.S. Nuclear Regulatory Commission, Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will be As Low As is Reasonably Achievable, Revision 3, June 1978.
[20] International Commission on Radiological Protection, Publication No. 55, Optimization and Decision-Making in Radiological Protection, 1989.